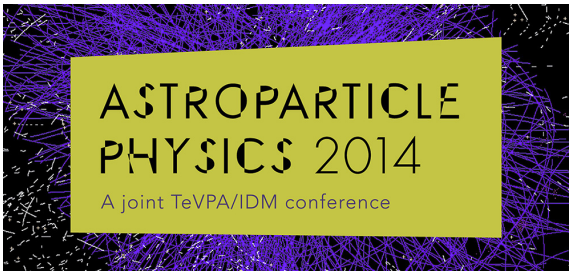

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Searching for dark matter in the extragalactic gamma-ray background

Monday 23 June 2014 18:00 (15 minutes)

The approximately isotropic gamma-ray background measured by Fermi-LAT probes the contribution from several classes of astrophysical sources. Using the catalog of known gamma-ray sources along with similar catalogues at radio wavelengths, we can model and constrain the contributions to the extragalactic gamma-ray background from astrophysical sources, as are radio galaxies, star-forming galaxies, and blazars.
Then combine that information with the measurement of the gamma-ray background one can derive constraints on the dark matter annihilation cross section, including contributions from both extragalactic and galactic halos and subhalos. The resulting current constraints are competitive with the strongest current constraints from the galactic center and dwarf spheroidal galaxies.
With a greater number of astrophysical sources observed in gamma-rays and other wavelengths, the gamma-ray contribution from various classes of extragalactic objects will become more tightly constrained, leading to subsequent improvement of the potential constraints on the dark matter annihilation. At the end of the Fermi-LAT mission, the sensitivity to dark matter annihilations will exceed the strongest current gamma-ray constraints by a factor of ˜ 5–10.
In addition, the contribution from dark matter annihilations to the anisotropy of the gamma-ray sky at high multipoles is maximal from low redshift galaxies.
Thus, cross-correlating the observed gamma-ray map with known galaxies, increases the sensitivity of dark matter annihilation searches in such objects and provides limits competitive to other gamma-ray searches.

Author: CHOLIS, Ilias (Fermi National Accelerator Laboratory)

Co-authors: Dr HEARIN, Andrew (Yale University); WENIGER, Christoph (University of Amsterdam); MCDERMOTT, Samuel; Dr HOOPER, dan (fermilab)

Presenter: CHOLIS, Ilias (Fermi National Accelerator Laboratory)

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